

# EDUCATION AND PRACTICE

## STRATEGIES OF HIGH-PERFORMING EMT-BASIC EDUCATIONAL PROGRAMS

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### ABSTRACT

**Introduction.** The objective of this project was to identify the specific educational strategies used by emergency medical technician (EMT) educational programs that have attained consistently high success rates on the National Registry of Emergency Medical Technicians (NREMT) examination. **Methods.** NREMT data from 2001 to 2005 was analyzed in order to identify consistently high-performing EMT-Basic educational programs. Representatives from each program were invited to participate in a focus group. Using the nominal group technique (NGT), participants were asked to answer the following question: "What are specific strategies that lead to a successful EMT-Basic educational program?" **Results.** Ten out of the 12 EMS educational programs meeting the eligibility requirements participated. After completing the seven-step NGT process, 12 strategies were identified as leading to a successful EMT-Basic educational program: 1) accept students who are highly motivated to succeed; 2) assure institutional support; 3) administer multiple assessments; 4) develop standardized lesson plans; 5) have a passing standard that is above the minimum competency level; 6) hire qualified/certified instructors; 7) maintain effective communication between didactic, practical, and field instructors; 8) maintain instructional consistency; 9) provide clearly defined objectives; 10) provide immediate feedback for written, practical evaluations to students; 11) require prerequisites; and 12) teach test-taking skills. **Conclusions.** Twelve specific strategies were identified by high-performing EMT-Basic programs. From these, seven recommendations to improve programmatic pass rates on the NREMT certification exam were derived. Further study should be conducted to determine if implementation of these recommendations improves programmatic pass rates on the NREMT certification exam.

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### INTRODUCTION

There are more than half a million state-licensed emergency medical technician (EMT)-Basics in the United States.<sup>1</sup> Accordingly, EMT-Basics are an essential part of the prehospital emergency care system.<sup>2</sup> EMTs encounter patients whose illnesses and injuries cover the entire spectrum of acuity and complexity. They must treat a highly diverse patient population, including all ages and conditions imaginable.<sup>3</sup> The EMT-Basic National Standard Curriculum (NSC) serves as the foundation for EMT-Basic education in the United States.<sup>4</sup> It is intended to be delivered in approximately 120 hours, with EMT courses lasting between 120 and 150 hours. Therefore, EMT-Basic educators are challenged with the difficult task of developing competency over a large, complex domain in a relatively short period of time.

One measure of EMT-Basic educational program effectiveness is first-attempt pass rate on the national certification exam. According to the National Registry of Emergency Medical Technicians (NREMT) Annual Report,<sup>5</sup> the nationwide EMT-Basic first-attempt pass rate dropped from 70% in 2002 to 65% in 2005.

Despite this trend, some EMT-Basic programs have maintained high first-attempt pass rates. Most educational programs are committed to instructional quality improvement; however, some struggle to identify which strategies have the greatest likelihood of leading to programmatic improvement. The objective of this project was to identify strategies employed by high-performing programs to maintain, and in some cases improve, first-attempt pass rates on the EMT-Basic national certification exam.

### METHODS

Data collected and utilized in this study came from a focus group which employed the nominal group

technique (NGT). The NGT takes advantage of pooled judgments. The technique is designed so that the judgments of a variety of people with varied knowledge and perspectives can be integrated to obtain consensus opinions. As a result, the group ideas are likely to be better than those that might be obtained by other methods. Focus groups using NGT have been used to evaluate medical school curricula,<sup>6</sup> undergraduate education programs,<sup>7</sup> and to identify areas of needed change in nursing curricula.<sup>8</sup>

The NGT process employs seven steps: 1) present a question to the group; 2) silent idea generation; 3) round robin idea submission; 4) discussion and clarification of generated ideas; 5) initial voting; 6) discussion/clarification; and 7) final ranking.<sup>9-12</sup>

Prior to conducting a NGT focus group, it is imperative to develop a clear question to present to the group that will yield responses to an *a priori* research question. Additionally, the group must consist of experts in the subject matter of interest.<sup>10</sup>

## Pilot Testing

Prior to convening the national focus group that served as the data source for this project, a beta- and pilot test were conducted.

### Beta Test

The main goal of the beta test was to ensure that the question posed to the group would yield responses capable of answering the research question. The beta test was facilitated by the investigator chosen to lead all future focus groups. Participants in the beta test consisted of six local emergency medical services (EMS) experts, two of whom were investigators and four of whom were local EMS educators unaffiliated with the project.

The question presented to the beta group was, "What are factors that lead to a successful EMT-Basic educational program?" Through the analysis of the data obtained, it was concluded that this question resulted in responses that were too broad to be converted into specific strategies that could be implemented. For example, "curriculum design" and "clinical application" may not be sufficiently specific to guide programmatic improvement.

As a result, the question posed to the group was modified to: "What are specific strategies that lead to a successful EMT-Basic educational program?" The facilitator was also instructed to encourage participants to focus future discussions on specific strategies that could be implemented.

### Pilot Test

The main goal of the pilot test was to evaluate the validity of the method used for selecting expert participants.

TABLE 1. Educational Program Inclusion Criteria

Pilot Test	Data Collection
<ul style="list-style-type: none"> <li>• A training site must have had 5 years of complete data.</li> <li>• A training site must have had at least 33 students for 4 of 5 years.</li> <li>• A training site must have had at least a 66% first-attempt pass rate for 4 of 5 years.</li> </ul>	<ul style="list-style-type: none"> <li>• A training site must have had 5 years of complete data.</li> <li>• A training site must have had at least 40 students for 4 of 5 years.</li> <li>• A training site must have had at least a 80% first-attempt pass rate for 4 of 5 years.</li> </ul>

Secondarily, the modified question posed to the group was tested to determine if the participants were able to generate specific educational strategies.

Programs were identified by sorting educational programs by the number of students attempting the national certification examination and its corresponding annual first-attempt pass rate. This was accomplished through use of the NREMT database.

Pilot testing of the selection process was conducted using a single state. In order to be eligible for participation in the pilot test NGT, educational programs must have met the criteria outlined in Table 1. Ten educational programs were identified and invited to participate in the pilot test. Seven programs sent representatives, for a total of 14 pilot participants. The pilot testing of the selection process revealed that the appropriate programs could be identified, and with slight modification (see Table 1), this process would be applicable at a national level.

The investigators identified that utilizing multiple participants from a single educational institution led to participants frequently differed opinions to the most senior member present. Therefore, it was decided that for the national focus group, one representative from each selected institution would be invited. Finally, the modified question posed to the group generated responses consistent with the objective of the study.

## Data Collection

The above selection criteria were applied to the NREMT database to identify high-performing EMT-Basic educational programs. Selected educational programs were contacted by mail and asked to participate. In the recruitment letter, it was requested that programs send the individual responsible for the leadership of the EMT-Basic portion of their operation to the national focus group. Follow-up e-mails and telephone calls were used to emphasize the importance of the participant's intimate knowledge of their EMT-Basic program.

The national focus group was scheduled to occur in Columbus, Ohio, on July 20 and 21, 2006. Participants were informed that they would be reimbursed for their travel and lodging expenses. There were no other incentives offered for participation. Prior to data collection, all participants signed informed consent and

TABLE 2. Demographics and Characteristics of Focus Group Participants

Characteristic	Sample (N = 10)
Gender	
n (%) male	5 (50%)
n (%) female	5 (50%)
Highest degree	
n (%) None	1 (10%)
n (%) Associate's	1 (10%)
n (%) Bachelor's	1 (10%)
n (%) Master's	7 (70%)
Is your program nationally accredited (CoAEMSP)?	
n (%) yes	6 (60%)
n (%) no	4 (40%)
Years of EMT teaching experience	
Mean $\pm$ SD	16.5 $\pm$ 11.5
Range	0-35
Average percent of time spent in:	
EMT instruction (mean $\pm$ SD)	51.4% $\pm$ 11.5
EMS instruction other than EMT (mean $\pm$ SD)	14.0% $\pm$ 6.5
Instruction other than EMS (mean $\pm$ SD)	12.5% $\pm$ 9.6
Administration (mean $\pm$ SD)	53.8% $\pm$ 40
Other (mean $\pm$ SD)	16.0% $\pm$ 16.0
Number of lead EMT instructors	
Mean $\pm$ SD	5.7 $\pm$ 4.6
Range	1-12
Number of lab/assistant EMT instructors	
Mean $\pm$ SD	22.7 $\pm$ 14.8
Range	5-50
Students per year	
Mean $\pm$ SD	145 $\pm$ 140
Range	40-500
EMT program attrition rate	
Mean $\pm$ SD	13% $\pm$ 10
Range	2-27

confidentiality statements. This project was granted institutional review board approval from the American Institutes for Research (Washington, DC).

## RESULTS

Nationwide, 12 programs met the inclusion criteria and were invited to participate. Ten programs sent representatives. The demographics of the meeting participants are summarized in Table 2.

When the group was convened, the investigator serving as facilitator briefly explained the study objective and the steps of the nominal group technique. The facilitator then presented the following question to the group, "What are specific strategies that lead to a successful EMT-Basic educational program?" and requested the group to engage in silent idea generation.

Following completion of silent idea generation, the "round robin idea submission" generated 104 unique responses to the question posed to the group. During the first discussion session, each response was clarified and ensured that each was a specific strategy. Participants then confidentially-voted for the five best strategies for EMT-Basic education programs attempting to consistently attain high pass rates on the NREMT cer-

TABLE 3. Instructional Strategies to Improve NREMT Pass Rates

Select students who are highly motivated to succeed.
Assure adequate institutional support.
Administer multiple assessments of student progress throughout the class.
Develop standardized lesson plans to be used when team teaching.
Establish a passing standard that is above the minimum competency level.
Hire qualified/certified instructors.
Maintain effective communication between didactic, practical, and field instructors.
Assure instructional consistency.
Provide clearly defined objectives to students and instructors.
Provide immediate feedback for written, practical evaluations to students.
Require prerequisites prior to admission.
Teach test-taking skills in class.

tification examination. Twenty-nine of the initial 104 strategies received at least one vote by one participant.

Next, the facilitator led an in-depth discussion intended to clarify the 29 remaining strategies. During this step, participants advocated for specific strategies they felt were the most important. The second round of secret balloting was conducted, yielding the 12 final strategies listed in Table 3. These final strategies were selected because there was a clear demarcation in the number of votes received after the twelfth strategy. An in-depth discussion on each of the 12 strategies was facilitated to provide the investigators with a detailed understanding of the major themes of each strategy.

## DISCUSSION

The NGT offers a number of advantages over other methods. A NGT balances participation and decreases the influence of individuals on group members.<sup>10</sup> It has been shown to produce a greater number of, and more creative ideas than, traditional interacting groups.<sup>7,9</sup> NGT reduces the conforming influence common to most face-to-face group meetings and encourages participants to confront issues on a problem-solving basis.<sup>6</sup> Finally, this technique results in greater satisfaction for participants and leads to a greater sense of closure and accomplishment.<sup>12</sup> Following is a summary of the 12 strategies and the major themes identified by the focus group participants.

### Select Students Who Are Highly Motivated to Succeed

Student motivation has been shown to influence student learning and achievement.<sup>13</sup> Focus group members acknowledged that student motivation can be either positive (desire for success) as in the case of wanting to do well to gain a good recommendation for employment, or negative (fear of failure) as in the case of being "forced" to pass the class as a condition of

continued employment. While there was general agreement that the positive motivation results in a more productive classroom environment, the participants acknowledged that negative motivation can be equally effective in yielding high pass rates on the national certification exam.

The most common situation of negative motivation involved students who were forced to attend an EMT course when certification was required for another job, such as a firefighter. The focus group identified the difficulty in teaching this group, as they tend to be focused on simply doing well enough to "pass the test" rather than learning what is necessary to become a competent EMT.

### **Assure Adequate Institutional Support**

The facilities, instructional personnel, and equipment necessary to run a successful EMT course generally exceed that of other courses. Participants noted that in most settings, it is difficult to generate sufficient revenue to support EMT classes by tuition alone. Complicated by limited opportunities for extramural funding,<sup>14</sup> it is necessary for institutions to support EMS through a sincere commitment to community service and EMS education.

It was identified that institutional support may waiver as personnel, leadership, organizational priorities, and funding change over time. It is the responsibility of the program leadership to continually "fight" for resources within the institution. Focus group participants emphasized the need to "go to bat for the EMT program" and assure that they received adequate support, such as classroom/laboratory space, equipment, instructors, and instructional support materials.

### **Administer Multiple Assessments of Student Progress throughout the Class**

The content of EMT classes tends to be progressive, requiring mastery of early concepts in order to be successful later in the class.<sup>15</sup> Comments such as "an EMT course is too short to allow people to fall behind" represent the general feeling of the group. Participants emphasized the need for frequent, early assessments throughout the class. It was noted that while most assessments tend to be in the cognitive domain, frequent psychomotor evaluation is equally important. It was specifically stated that not all assessments need be formal, but should be frequent. Examples included daily or weekly quizzes, graded homework, and frequent skills testing.

### **Develop Standardized Lesson Plans to be Used when Team Teaching**

Most programs represented by focus group participants conducted multiple EMT classes each year, often oc-

curing concurrently. In general, a "lead instructor" assumed the responsibility for the majority of instruction of a single class. It appears that successful programs developed standardized lesson plans and instructional materials that were used by all faculties, thereby increasing classroom consistency. When probed, it appeared that most programs began with commercially available instructional materials and used faculty meetings and other group activities to modify them to meet their needs. Unlike the majority of respondents in the State of EMS Education Research Project (SEERP),<sup>16</sup> none of the participants used "off the shelf" products or the NSC without some modification.

### **Establish a Passing Standard that Is Above the Minimum Competency Level**

Credentialing exams, such as the NREMT examination, generally establish cut scores that reflect entry-level competence. Focus group participants commented that educational programs should teach and test above entry-level competency. Establishing a course-passing standard exceeding minimum competency enables program instructors to be confident that graduates should pass the credentialing exam. Of interest was the notion that high standards lead to high success. Comments such as "my tests are harder than the National Registry exams so I *know* if they pass my course, they will pass the certification exam" seemed to reflect the general opinion of the group.

### **Hire Qualified/Certified Instructors**

The selection of faculty was a topic of considerable discussion. Instructor quality in the areas of practical knowledge, teaching ability, enthusiasm, availability outside of class, and technical knowledge have been shown to have a significant effect on the preparedness of EMS students.<sup>17</sup> Focus group participants generally agreed that EMT instructor training/certification and meeting the state minimum standards alone was insufficient. Many programs required formal educational degrees (usually bachelors degree or above) for lead instructors as well as formal teaching experience (typically experience as a lab instructor and/or guest lecturer).

There was also general consensus that EMT-Basic instructors need to have clinical experience as an EMT. However, some disagreement emerged regarding the level of clinical certification ideal for teaching EMTs. The majority of the group suggested that EMT instructors should have experience beyond that of an EMT (i.e., should be paramedics, nurses, physicians, etc.), and that the greater knowledge base helped them answer in-depth questions as well as elaborate on EMT instructional material. A few members of the group disagreed, suggesting that individuals with higher certifications

tended to drift from the core material and lose focus on EMT-appropriate depth and breadth of coverage. No consensus emerged.

### **Maintain Effective Communication between Didactic, Practical, and Field Instructors**

In programs with multiple instructors, communication between instructional staff is critical to programmatic success. Focus group participants recognized the need for all instructors to communicate regularly to maintain consistency and share information regarding student progress and problems. The most common strategy involved regular faculty meetings where student, curricular, operational, and administrative issues are discussed.

### **Assure Instructional Consistency**

The focus group felt that the practice of teaching multiple perspectives and techniques was confusing to students and detrimental on certification exams. In particular, it is important to avoid the tendency for lab/clinical/field instructors to inadvertently undermine the instructional process by showing students "short cuts" and avoiding comments such as "I know what you learned in class, but this is how it is done in real life."

### **Provide Clearly Defined Objectives to Students and Instructors**

EMS education tends to be highly behavioralistic and emphasizes clearly defined cognitive and psychomotor objectives. Focus group participants emphasized that objectives should be communicated to students and instructors alike. Instructors should avoid the tendency to teach material beyond the scope of the EMT. The National Standard Curriculum (NSC) was identified by participants as a source of EMT objectives; however, most programs appear to use publisher-developed objectives as a starting point and modified them accordingly. In contrast to SEERP data, no program identified that they used the NSC objectives without modifications.<sup>18</sup>

### **Provide Immediate Feedback for Written and Practical Evaluations to Students**

Focus group members felt that frequent, formative written and practical evaluations should be used as an opportunity to monitor and improve student performance. The most commonly discussed strategy involved the timely review of written exams and practical evaluations. Successful programs dedicated class time to reviewing content and skills that proved to be difficult for a large proportion of students.

### **Require Prerequisites Prior to Admission**

Basic academic skills are an important determinant to success in any postsecondary educational endeavor. When compared to other allied health medical professions, EMT education is of relatively short duration and generally is a "stand alone" course, as opposed to a program of instruction. Consequently, there is usually not sufficient time to address deficiencies in basic academic skills. The group specifically identified reading comprehension as essential for success in an EMT course. Two main strategies appeared to be used to assure incoming students had the academic skills necessary to succeed. Some programs incorporated pretesting, while others required the successful completion of formal coursework (English, Math, Anatomy and Physiology, etc.) as prerequisites to admission in the EMT class. Researchers in other academic settings have noted that the two best predictors of academic achievement in postsecondary education are high school class rank and admission test scores.<sup>19-21</sup>

### **Teach Test-Taking Skills in Class**

Test taking is a skill that requires practice to increase the likelihood that scores accurately reflect ability. In fact, it has been shown that the practice of teaching test-taking skills produced a significant improvement in students' scores on achievement tests.<sup>22</sup> EMS credentialing exams use the multiple-choice format. Focus group participants felt that it was important to include sufficient multiple-choice items on classroom exams to prepare students for that testing format. For some programs, test-taking skills were taught informally during review of the exams, while others dedicated class time to specifically teaching test-taking strategies.

### **Recommendations**

Based on the analysis of the data collected from a nominal group technique, the investigators were able to construct seven recommendations. It is hypothesized that implementation of the following recommendations would improve programmatic pass rates on the NREMT credentialing exam.

- Secure strong institution support to ensure that the EMT-Basic program has the resources necessary for success.
- Hire lead instructors who have EMT instructor training/certification, EMT-level clinical experience, and EMT teaching experience, as well as formal educational credentials.
- Strive for instructional consistency through the development of clear objectives, standardized lesson plans, and frequent communications among and between EMT faculty members.

- Recruit students who are positively motivated to succeed.
- Admit students who, either through prerequisite coursework or pretesting, have demonstrated that they have the academic skills necessary to complete the course.
- Develop student test-taking skills by frequently administering written, practical assessments and provide timely feedback on performance.
- Encourage excellence by establishing passing standards that exceed minimum competency.

## Limitations

NGT focus groups are most valid when the most appropriate "experts" are chosen for participation. As such, the participant selection process is an area that may have introduced bias into this study. Briefly, participants were selected based on program performance on the NREMT examination and the number of graduates per year. Pass rates are not the only indicator of program success. However, pass rates on national certification examinations were the only readily available, constantly applied standard and were consequently used as a surrogate indicator of educational quality. Also, focus group participants came from educational institutions graduating 40 or more EMT-Basic students per year. Thus, smaller education programs with high pass rates were not included.

It is also important to note that program information was abstracted from the NREMT database. The NREMT database, the only national database of EMS educational programs, does have several limitations. Namely, complete graduation data for all programs may not be available, and some programs have multiple names or site codes. This may have resulted in inaccurate calculation of programmatic pass rates and/or omission of eligible programs.

When collecting data in a focus group, it is important to recognize the affects of group dynamics on participants. A NGT minimizes this effect, but it cannot be eliminated. Qualitative research is inherently subjective, and it is possible that persuasive individuals affected the opinion of others.

## CONCLUSIONS

Twelve specific strategies were identified by high-performing EMT-Basic programs. From these, seven recommendations to improve programmatic pass rates on the NREMT certification exam were derived. Further study should be conducted to determine if implementation of these recommendations improves programmatic pass rates on the NREMT certification exam.

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